REMARKS

Applicants have considered the outstanding official action. It is respectfully submitted that the claims are directed to patentable subject matter as set forth below.

The drawings are objected to as failing to comply with 37 CFR § 1.84(p)(5) because they include reference characters not mentioned in the specification. Applicants have amended the specification to include reference numeral "15" and reference character "B_0" in the description of Figure 3 at page 8, lines 7-15. Applicants have also amended the specification to include reference numeral "11" and reference character "B_0" in the description of Figure 2 at page 7, line 16 to page 8, line 5. Accordingly, the drawings comply with 37 CFR § 1.84(p)(5). Withdrawal of the objection under 37 CFR § 1.84(p)(5) is respectively requested.

The drawings are further objected to with regard to component 13 of Figure 3. Specifically, the Examiner states that "the "blank box" component 13 of Figure 3 should be labeled as "conveyor device."" Applicants respectfully traverse the objection and submit that the words "conveyer device" are present with respect to reference number "13" in the written description of Figure 3 on page 8, lines 9 and

11 and are, therefore, not required to be added to Figure 3. Withdrawal of the objection to Figure 3 is respectfully requested.

The specification and Abstract are objected to because of certain informalities. The informalities noted by the Examiner and other informalities have been corrected by amendment to the specification and Abstract. Withdrawal of the objection to the specification and Abstract is respectfully requested.

Claims 27 and 28 are objected to under 37 CFR § 1.75(c) as being in improper multiple dependent form. Claims 27 and 28 each depend from single claim 26 wherein claim 26 is a multiple dependent claim which depends from "any one of claims 15-25". Applicants respectfully traverse the objection since claim 26 is in proper multiple dependent form (see MPEP 608.01(n), p. 600-86) and claims 27 and 28 are each properly dependent singly on claim 26. Thus, claims 27 and 28 each require the limitations of claim 26 and the limitation(s) of one of claims 15-25. Withdrawal of the objection to claims 27-28 is respectfully requested.

The rejections based on art are as follows:

(1) Claims 15, 18-24 and 26-28 under 35 U.S.C. §103(a) over U.S. Patent No. 5,146,166 (Bartuska); and

(2) Claims 16, 17 and 25 under 35 U.S.C. §103(a) over Bartuska as applied to claims 15, 18-21, 23, 24 and 26-28 above, and further in view of U.S. Patent No. 5,876,338 (Gilderdale).

Claim 15 is the sole independent claim. Claim 15 claims a probe head for NMR measurements in a magnetic system, comprising a bore extending in parallel with a base magnetic field for receiving the probe head through a lower opening thereof, wherein the probe head includes a support body carrying at least one solenoid coil as measuring coil, the solenoid coil having a coil axis perpendicular to the base magnetic field when inserted in the bore, a feed line towards the solenoid coil via which a sample material can be introduced into a measuring volume surrounded by the solenoid coil. The feed line is configured for receiving and conveying sample containers through the measuring volume.

In particular, the probe head is used with magnetic systems in which the probe head has to be inserted through a lower opening of the bore. The magnetic system is closed at the upper opening, as shown in Figure 1. To change samples in such a system, the inserted probe head must be removed from the bore through the lower opening and a probe head with new samples then inserted through the lower opening. The probe head as claimed permits for

automatic serial measurements of different samples in a simple manner in a magnetic system having a bore accessible only at the lower side.

The probe head of claim 15 includes a solenoid coil as a measuring coil which is carried by a support body of the probe head. The solenoid coil has a coil axis perpendicular to the base magnetic field when the probe head is inserted in the bore of the magnetic system (see Figures 2 and 3 showing the direction of the base magnetic field B_0 and the arrangement of solenoid coil 7). The feed line is configured for receiving and conveying sample containers through the measuring volume surrounded by the solenoid coil. Thus, the sample material is charged into sample containers which are fed through the feed line in a conveying direction to the measuring volume and, after measurement, conveyed in the same conveying direction out of the measuring volume. More particularly, the probe head as claimed can be inserted through the lower opening of the bore into the bore of the magnetic system and remain there, while the samples are being fed via the feed line one after the other through the measuring volume without the necessity of moving the probe head out of the bore. Furthermore, the solenoid coil arranged with the coil axis perpendicular to the direction of the base magnetic field results in high

homogeneity of the high frequency throughout the measuring volume.

Bartuska describes an automatic liquid sample changer for use with a magnetic resonance spectrometer. The automatic liquid sample changer has separate upper and lower openings in a sample container guide tube so that in use a sample container passes by gravity into an analysis area from an upper positioned storage rack, and then subsequently moves by gravity from the analysis area into a lower positioned storage rack. Air bearing or other supports which do not frictionally engage a sample container are used to achieve a spinning movement of the sample container within the guide tube. Such a sample changer is also known as a spinning rotation system due to the spinning air introduced for achieving the spinning movement of the sample containers.

As shown in Figures 1 and 2, Bartuska teaches a system which requires an accession of the magnetic system from the lower and upper ends. Therefore, such a sample changer is not usable with magnetic systems having a bore extending in parallel with a base magnetic field, the bore being only accessible from the lower opening.

Bartuska also teaches the use of an inelastic straight feed line which requires gravitation to transport samples in and out of a measuring volume. Based on the

requirement of gravity to transport as taught in Bartuska, it would not be obvious to one skilled in the art to provide a probe head for a magnetic system which is only accessed from one side, i.e., from a lower opening of the magnetic bore. Such structure does not allow for transport to and from an analysis area by gravity.

Bartuska also does not teach or suggest a solenoid coil arranged perpendicular to the direction of the base magnetic field. A solenoid coil in such an arrangement cannot be obvious to one skilled in the art in view of the disclosure of Bartuska which is silent thereon. The coil of Bartuska must be arranged in parallel with the basic magnetic field, not perpendicular to the base magnetic field as claimed. Therefore, the perpendicular arrangement of the coil axis as claimed by applicants is not taught or suggested by Bartuska.

With respect to claim 20, the spinning air of Bartuska is not taught for transporting sample containers through a feed line. Rather, Bartuska teaches transport of sample containers by gravitation. The spinning air is taught in Bartuska only for generating a spinning rotation of the containers when falling by gravity, not for conveying the sample containers.

With respect to claim 21, the sample containers of Bartuska are also not constructed and arranged for complete

introduction into a measuring volume. As shown in Figures 1 and 2 of Bartuska, the analysis area (coil) 12 which defines the measuring volume covers only a portion of the probe samples. Bartuska teaches that only a substantial portion of the sample container is surrounded by the analysis area 12, not complete introduction as claimed (see column 6, lines 11-13).

With respect to claim 22, one skilled in the art of NMR or magnetic resonance spectroscopy would know that spinning rotation systems, as that of Bartuska, use standard sized sample containers which are more than a magnitude larger than sample containers designed for sample volumes of $\leq$ 1 ml. Therefore, the corresponding statement of the Examiner is incorrect.

With respect to claim 27, the same applies thereto as set forth above with respect to claim 20.

Accordingly, Bartuska does not teach or suggest the probe head as claimed. Bartuska does not provide any motivation to modify the teachings of Bartuska in order to provide the claimed probe head. Accordingly, Bartuska does not render the claimed probe head obvious within the meaning of 35 U.S.C. §103(a). Thus, withdrawal of the §103 rejection is respectfully requested.

Bartuska is also applied in combination with Gilderdale to reject dependent claims 16, 17 and 25 under 35

U.S.C. §103(a). Gilderdale is relied on by the Examiner solely as to added limitations of the noted dependent claims regarding the manner of connection of the solenoid coil to the support body which are acknowledged by the Examiner to not be taught in Bartuska. Bartuska, however, does not provide any teaching to obtain the probe head as claimed in independent claim 15 as set forth above and Gilderdale does not make up for these shortcomings. Accordingly, Bartuska in combination with Gilderdale does not render the probe head as claimed obvious within the meaning of 35 U.S.C. §103(a). Thus, withdrawal of the §103 rejection is respectfully requested.

Reconsideration and allowance of the claims are requested.

Respectfully submitted,

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